

What Is Claimed Is:

1. A computer-implemented method for utilizing shape analysis to assess fetal abnormality, comprising:
 - receiving coordinates of points identifying a shape in a fetal image;
 - determining coefficients of one or more mathematical functions that describe the identified shape; and
 - utilizing the determined coefficients as markers to assess fetal abnormality.
2. The method of claim 1, wherein the fetal abnormality is a chromosomal abnormality.
3. The method of claim 2, wherein the chromosomal abnormality is Down syndrome.
4. The method of claim 1, wherein the fetal abnormality is Spina Bifida.
5. The method of claim 1, wherein the points are placed upon a computer monitor.
6. The method of claim 1, wherein the points are placed upon a 3D ultrasound image.
7. The method of claim 1, wherein the points trace an outline around a part of the fetal image to be analyzed.
8. The method of claim 1, wherein the coefficients are determined by a Fourier analysis.
9. The method of claim 1, wherein the coefficients are determined by a shape analysis method selected from the group consisting of elliptical Fourier analysis, polynomials, cubic splines, parametric polynomials, parametric cubic splines, bezier curves, Fourier analysis of equally spaced radii and dual axis Fourier analysis.
10. The method of claim 1, wherein the determined coefficients are utilized as markers to assess fetal abnormality in the first trimester.

11. The method of claim 1, wherein utilizing the determined coefficients as markers comprises conducting a statistical analysis on the determined coefficients.
12. The method of claim 11, wherein the statistical analysis compares the determined coefficients with reference parameters derived from a statistical distribution of determined coefficients in the unaffected population and/or affected population.
13. The method of claim 12, wherein the conducted statistical analysis on the determined coefficients includes at least one of a means calculation, a standard deviation calculation and a correlation calculation.
14. The method of claim 12, wherein the conducted statistical analysis on the determined coefficients includes a principal component analysis.
15. The method of claim 12, wherein the conducted statistical analysis results in an indication of risk of fetal abnormality.
16. The method of claim 12, wherein the conducted statistical analysis results in a likelihood ratio for a fetal abnormality.
17. The method of claim 12, wherein the conducted statistical analysis results in an index value to be considered within range or outside of range for a fetal abnormality.
18. The method of claim 1, comprising utilizing the determined coefficients as markers in combination with one or more additional markers to assess fetal abnormality.

19. The method of claim 18, wherein the one or more additional markers includes at least one biochemical marker selected from the group consisting of free Beta hCG and PAPP-A, maternal blood alpha-fetoprotein, maternal blood hCG, maternal blood unconjugated estriol, maternal blood dimeric inhibin A, maternal urine total estriol, maternal urine beta core fragment, maternal urine hyperglycosylated hCG and maternal blood hyperglycosylated hCG.
20. The method of claim 18, wherein the one or more additional markers includes at least one ultrasound marker selected from the group consisting of nuchal translucency, Ductus Venosus, absent or hypoplastic nasal bone, nuchal edema, short femur, hyperechogenic bowel and echogenic foci in the heart.
21. The method of claim 1, further comprising:
adjusting the received coordinates to align the shape according to a particular axis before the coefficients are determined.
22. The method of claim 1, further comprising:
adjusting the received coordinates before the coefficients are determined by at least one of translating the coordinates, rotating the coordinates and scaling the coordinates.
23. The method of claim 22, wherein utilizing the determined coefficients as markers comprises conducting a statistical analysis on the determined coefficients.
24. The method of claim 23, wherein the statistical analysis compares the determined coefficients with reference parameters derived from a statistical distribution of determined coefficients in the unaffected population and/or affected population.

25. An apparatus for utilizing shape analysis to assess fetal abnormality, comprising:
- a processor; and
 - a memory storing instructions adapted to be executed by said processor to:
 - receive coordinates of points identifying a shape in a fetal image;
 - determine coefficients of one or more mathematical functions that describe the identified shape; and
 - utilize the determined coefficients as markers to assess fetal abnormality.
26. A system for utilizing shape analysis to assess fetal abnormality, comprising:
- a means for receiving coordinates of points identifying a shape in a fetal image;
 - a means for determining coefficients of one or more mathematical functions that describe the identified shape; and
 - a means for utilizing the determined coefficients as markers to assess fetal abnormality.